



Technical Assistance

TAR: PRC 37603

Technical Assistance to the People's Republic of China for Preparing the Nanjing Qinhuai River Environmental Improvement Project

July 2005

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 15 June 2005)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.121
\$1.00	=	CNY8.2766

ABBREVIATIONS

ADB	–	Asian Development Bank
DI	–	design institute
EIA	–	environmental impact assessment
FS	–	feasibility study
IA	–	implementing agency
NMCC	–	Nanjing Municipal Construction Commission
NMDRC	–	Nanjing Municipal Development and Reform Commission
NMEPB	–	Nanjing Municipal Environmental Protection Bureau
NMFB	–	Nanjing Municipal Finance Bureau
NMG	–	Nanjing Municipal Government
NMPUB	–	Nanjing Municipal Utilities Bureau
NQREIP	–	Nanjing Qinhuai River Environmental Improvement Project
PMO	–	project management office
PPMS	–	project performance monitoring system
PRC	–	People's Republic of China
RP	–	resettlement plan
TA	–	technical Assistance
t/d	–	tons per day
TOR	–	terms of reference
WWTP	–	wastewater treatment plant

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Multisector: Water supply, sanitation, and waste management; agriculture and natural resources
Subsectors	–	Waste management, integrated; water resource management
Themes	–	Environmental sustainability, sustainable economic growth
Subthemes	–	Urban environmental improvement, institutional development

NOTE

In this report, "\$" refers to US dollars.

This report was prepared by L. Sabyrova (team leader) and S. Wermert.

NANJING QINHUAI RIVER ENVIRONMENTAL IMPROVEMENT PROJECT IN THE PEOPLE'S REPUBLIC OF CHINA



I. INTRODUCTION

1. During the review and update of the country strategy and program for the People's Republic of China (PRC)¹ in October 2004, the Government requested the Asian Development Bank (ADB) to include the Nanjing Qinhuai River Environmental Improvement Project (NQREIP)² into the lending program, and to provide project preparatory technical assistance (TA) for the NQREIP.³ A Reconnaissance Mission was conducted in March 2005, and a Fact-Finding Mission was fielded in May 2005. The Mission had discussions with key stakeholders and reached an understanding with the Nanjing municipal government (NMG) and concerned central and provincial authorities on the proposed Project's objectives and scope, and the objectives, outputs, cost estimates, financing plan, and implementation arrangements for the TA.⁴

II. ISSUES

2. Nanjing is located on the lower reaches of the Changjiang (Yangtze) River and is the capital of Jiangsu Province. It is an important transportation hub and, due to the city's long and distinguished history (being the ancient capital of 10 dynasties spanning 450 years), is a cultural center in eastern PRC. Nanjing is a rapidly developing city with a total population of about 6.5 million, of whom 4.5 million comprise the urban population. Official data record about 27% of the population as agriculture-based in 2003 compared with over 50% in 1990, indicating a sizable movement of the population to urban areas. Nanjing comprises 11 districts and 2 counties. Eight of the districts now form what is considered the main urban area. The three outlying districts were formerly counties that have been upgraded to urban district status in light of recent urbanization and future development plans. As in many large PRC cities, rapid economic growth over the past 20 years has placed increased stress on the environment and city infrastructure. High population density in the main downtown area has been a constraint to improved livelihood. The current treatment rate of wastewater generated in Nanjing is approximately 66%.

3. Qinhuai River, referred to as the "mother river" of Nanjing, flows through the urban area before it joins the Yangtze River. It has a total reach of 110 kilometers (km), with the lower 34 km passing through the city's main urban districts, and has many tributaries. The official water quality target for the lower Qinhuai River is class V, but currently the river fails to achieve that target by a significant margin. The high intensity of rainfall has historically caused localized urban flooding in some areas of the city, while the flat topography and lack of natural flow in local watercourses result in stagnant water and the associated health and sanitation problems during the dry periods. The urban poor, including those among the floating population and new migrants, suffer most from the existing problems of water pollution and flooding.

4. NMG has responded to these challenges by making major investments in wastewater treatment, urban drainage, and river channel improvements on local watercourses during the past 10 years. The city has a well-prepared development plan with a principal planning horizon up to 2010. The main development objectives of the city are to continue a high and sustainable rate of economic growth as the main means of improving the quality of residents' livelihood and reducing

¹ ADB. 2004. *People's Republic of China. Country Strategy and Program Update (2005-2007)*. Manila: ADB. The inclusion of the Project was confirmed during the Country Programming Mission held in April 2005.

² Nanjing was nominated as the PRC pilot city for the Water for Asian Cities Program implemented by ADB and the United Nations Human Settlements Programme (UNHABITAT).

³ In addition to the Nanjing Qinhuai River Environmental Improvement Project, the Government requested advisory technical assistance to support corporate bond issue to fund projects to be undertaken by Nanjing Water Services Group Limited, an integrated water and wastewater company to be established. The public and private sector activities supported by ADB will complement each other, but will be prepared and implemented autonomously.

⁴ The TA first appeared in *ADB Business Opportunities* (internet edition) on 16 May 2005.

the poverty that still exists for some urban and rural residents.⁵ Growth in gross domestic product is needed to provide employment for the continuously migrating population from rural areas to the urban areas, as well as from neighboring provinces and cities. NMG has developed plans to meet its urban environmental objectives, which it intends to formalize and restate in its 11th City Five-Year Plan for 2006–2010, currently under preparation.

5. The proposed NQREIP will address the above key urban environmental challenges and is being designed as a natural extension of the investments made in recent years. The rationale is to reduce waterborne pollution and urban flood risk in Nanjing, with particular focus on the Qinhuai River catchment. The Project will improve the urban environment and public health through better management of wastewater and urban watercourses, and will improve the quality of life for the urban poor by mitigating health and other risks from localized flooding and inadequate sanitation.

6. On the basis of discussions with NMG, criteria for the inclusion of project components in the NQREIP were identified.⁶ After discussions with NMG and project agencies, field visits, and with the objective of achieving maximum developmental impact and value-added from the ADB investment, the identified subprojects were grouped into four multisector components: municipal wastewater management (component A), river system management (component B), stormwater management (component C), and sludge management (component D).

7. **Municipal wastewater management** includes construction of 2 extensions to wastewater treatment plants (WWTPs) and 13 sewer system subprojects. The WWTPs are (i) phase 2 East WWTP with planned capacity of 100,000 tons/day (t/d), to serve the southeast portion of the urban Nanjing area and encompassing the middle section of Outer Qinhuai River; and (ii) phase 2 Jiangning Science Park WWTP in the new development area of Nanjing with a rapidly growing population, with a planned capacity of 40,000 t/d. This component includes construction of 130 km of dedicated wastewater sewers and the associated secondary branches, which will intercept sewage and convey it to the prospective WWTPs; and five dual-purpose pumping stations.

8. **River system management** includes (i) flow augmentation, (ii) bank stabilization and erosion control, (iii) water replenishing, and (iv) construction of an urban wetland area. Nanjing has relatively low ground elevation and many rivers, canals, and other waterways; therefore, flood control has been an important task. Historically Qinhuai River's tributaries were interconnected with sufficient flow capacities. Through years of siltation and improperly managed development activities, flows from these waterways have been greatly reduced and at several locations are completely blocked. This component is expected to restore the flood control function of the waterways and facilitate their self-purification functions.

9. **Stormwater management** includes the construction and/or renovation of seven pumping stations, construction of 80 km of stormwater discharge pipes, and evaluation of improvements to the current centralized stormwater management center. Because of relatively low ground elevations, the city's stormwater management relies solely on reliable pumping stations and waterways with sufficient flow capacities. Localized floods are almost certain to occur several

⁵ The overall percentage of population receiving assistance is about 2%. The basic welfare system for protection from poverty is the "minimum living standard scheme", and at present some 72,000 urban residents are registered for supplementary assistance under this scheme. There are no specific areas where poor people are concentrated; rather, they are scattered throughout the city.

⁶ These included (i) strong link to the overall project rationale, (ii) maximum social impact, (iii) least resettlement impact, (iv) timeliness of proposed works in relation to the indicative NQREIP implementation schedule, and (v) preparation status and readiness to participate. In addition, the results of the diagnostic study of Nanjing's water and wastewater sector prepared under the Water for Asian Cities initiative have been used for identifying potential projects.

times a year without the pumping stations. The purpose of this component is to develop a reliable and effective flood management system that allows all stations to work in a coordinated manner and prevent situations of simply transferring floods to other areas.

10. **Sludge management** will evaluate the treatment and disposal options for the sludge generated from operations of the Nanjing's WWTPs (including those to be constructed under component A) and the river dredging activities (that form part of component B). Sludge management will develop the overall least-cost alternative for sludge disposal to a stage that can be readily implemented. Currently NMG believes that a dedicated sludge disposal landfill is the optimum solution, but it needs to be further reviewed during the TA.

11. Capacity-building initiatives including managerial and information system improvements, together with technology and knowledge transfers, will increase the value added of the TA and the ensuing project. The TA consultants will study and give advice to NMG on (i) wastewater institutional arrangements; (ii) improvements in sewerage operations, including possible upgrading of geographic information systems (GIS); (iii) improved management of flood alleviation and water flows in the local river system; and (iv) other policy and reform issues.

12. The project objectives are similar to those of the successfully implemented Suzhou Creek Rehabilitation Project. Several other ongoing ADB projects including those in Anhui, Fujian, Hebei, and Hubei provinces, feature pollution control initiatives. The project is consistent with ADB's country strategy and with the Government's objectives in the urban, social, and water sectors.

13. During the review and identification of the project components, several policy-related issues were discussed, including integrated environmental approaches and solutions, and economically sound investments. As a result, component D was included in the project scope, and the scope of component A was revised. Other policy discussions evolved around the institutional setup of the water and wastewater sector and proposed reforms, the flow of funds in the sector, the tariffs and financial sustainability of the enterprises, and the potential for private sector involvement. The preliminary total cost of the project is CNY2,033 million (\$246 million), of which the proposed ADB loan is estimated at \$100 million.

14. During the preparation of the TA, NMG and ADB reviewed the lessons learned from other TAs funded by ADB in the PRC and other countries, and how that experience can best be incorporated in the TA. Feasibility study (FS) reports commissioned by implementing agencies (IAs) and prepared by domestic design institutes (DIs) provide the foundation for the TA work, further project preparation, and loan approval by the national and ADB authorities. However, these FSs often do not fully meet their purpose. Para. 17 describes the modified arrangement for the TA to ensure the quality of FSs at entry.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

15. The TA will prepare an investment project suitable for ADB financing that will facilitate economic development, improve environment and quality of life in Nanjing through extended and improved wastewater treatment and sewerage infrastructure, river system management, and mitigation of flood risks. The TA will help NMG establish the technical, economic, financial, social, and environmental justification of the proposed project and prepare plans in compliance with ADB's safeguard policies. In addition, the TA will assist NMG on policy issues and required

capacity building, and will review the proposed project implementation arrangements. The design and monitoring framework is in Appendix 1, and the initial poverty and social analysis is in Appendix 2.

B. Methodology and Key Activities

16. The TA will review and analyze the medium- and long-term sector plans for wastewater and environmental management in Nanjing municipality, in the context of broader integrated water resources management and the Nanjing urban development plan. Changes in the sector plans will be recommended to make them more responsive to the development objectives of Nanjing, and to provide an improved water environment to its residents, particularly the vulnerable groups. The scope of works included in the proposed project will be analyzed in the context of both the Nanjing urban development plan and sector policies. The individual project components and viable alternative solutions will be analyzed in detail to establish project justification based on least-cost criteria, and to minimize adverse environmental and social impacts. The justification process will follow relevant ADB and national guidelines. The TA will develop measurement of baseline health and environment indicators for future monitoring of NQREIP benefits.

17. On the basis of (i) discussions with NMG, the proposed IAs and DIs; and (ii) review of some existing FSs, the current capacity of IAs and DIs to produce the required FSs was assessed, and the project team prepared an outline terms of reference (TOR) tailored to the FSs for the proposed project components. Two workshops on ADB policies and procedures, and in particular on FS requirements and TA procedures were held for the Executing Agency, IAs, and DIs. The IAs agreed to utilize this outline TOR in procuring project preparatory work from the DIs. NMG agreed to ensure that the FSs are undertaken in accordance with the proposed TOR to the extent possible to ensure good quality FSs and smooth TA implementation. Close coordination between the TA consultants and the DIs will enhance their capacity to undertake FSs in accordance with international standards.

C. Cost and Financing

18. The total cost of the TA is estimated to be \$800,000 equivalent, comprising \$432,000 in foreign exchange and \$368,000 equivalent in local currency. The Government has requested that ADB finance \$600,000 equivalent, covering the entire foreign exchange cost and \$168,000 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB's TA funding program. The Government has agreed to provide the balance of the local currency cost, equivalent to \$200,000, for counterpart staff, office space, furniture, administrative support, and logistics, as well as financing the preparation of FSs, environmental impact assessments, and resettlement plans. Details of the cost estimates and the financing plan are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

19. NMG will be the Executing Agency for the TA. A project leading group, chaired by the vice mayor of NMG, was formed to provide overall guidance and support to project preparation. It includes directors of Nanjing Municipal Construction Commission (NMCC), Nanjing Municipal Development and Reform Commission (NMDRC), Nanjing Municipal Finance Bureau (NMF), Nanjing Municipal Environmental Protection Bureau (NMEPB), Nanjing Municipal Public Utilities Bureau (NMPUB), and a Jiangning district representative. A project management office (PMO)

will be established within the NMCC. The director of the NMCC will be the director of the PMO. The PMO will ensure interdepartmental coordination and the TA team's access to reports, information, and data needed for the effective conduct of the TA. The PMO will also be responsible for liaising with ADB during preparation of NQREIP. The vice director of NMCC will be the PMO executive deputy director. The PMO will include representatives from NMCC, NMDRC, NMFB, NMEPB, NMPUB, Nanjing Construction Investment Corporation (NCIC), Jiangning district, and others as may be necessary to facilitate TA activities. One experienced and qualified PMO staff member will work full-time for the TA and will work closely with the consulting team.

20. The Mission discussed with NMG the basic principles for identifying and selecting IAs. Based on the criteria, five IAs were confirmed: Nanjing Municipal Water Company, Qinhuai River Construction Development Company, Jiangning Water Company, Nanjing Drainage Management Division, and Nanjing Municipal Engineering Construction Division.

21. The TA will be implemented over 7 months, from approximately November 2005 to June 2006. A total of 46.5 person-months of consulting services will be provided: 18.5 international and 28 domestic. International and domestic consultants will provide expertise in municipal and river/hydraulics engineering, social analysis and resettlement, environmental impact assessment, and financial, economic, and institutional analyses. ADB will engage an international consulting firm, in association with domestic consultants, in accordance with *ADB's Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for engaging domestic consultants. The quality- and cost-based selection method and simplified technical proposal procedure will be used. The outline TOR for consulting services is in Appendix 4. Equipment provided under the TA for consulting services will be procured in accordance with *ADB's Guidelines for Procurement*.

22. The consultants will prepare inception, interim, draft final, and final reports, and improve and modify the resettlement plans and prepare summary environmental impact assessment in accordance with ADB's requirements. Workshops attended by a broad group of project stakeholders, and tripartite review meetings involving NMG, ADB, and the consultants will be held to guide the consultants and to review their reports. The consulting team will coordinate closely with the consulting team for the TA to support a potential corporate bond issue to fund projects to be undertaken by Nanjing Water Services Group Limited, whose subsidiaries include at least one of the project IAs. Close coordination on information and activities will take place in strengthening the managerial and institutional capacities of the company, improving efficiency of its operations, and other capacity-building measures.

IV. THE PRESIDENT'S DECISION

23. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$600,000 on a grant basis to the Government of the People's Republic of China for preparing the Nanjing Qinhuai River Environmental Improvement Project, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators ^a	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Enhanced environmental protection, economic development, and improved quality of life in Nanjing</p>	<p>Percentage of water bodies in the project area meet target levels by 2010.</p> <p>Percentage of waterborne diseases, and the associated average number of sickdays at the workplace decreased from 2005 to 2015.</p> <p>Percentage of people living in flood-prone areas decreased from 2005 to 2015.</p>	<p>Official NMG statistics</p> <p>Nanjing EPB monitoring data</p> <p>Socioeconomic surveys and project data</p> <p>Nanjing public health department statistics</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • Project design is implemented effectively. • ADB and the Government sign loan agreement. • Applicable national and local environmental laws and regulations are enforced.
<p>Outcome</p> <p>Project design and feasibility studies (FSs) agreed upon by the Government and ADB</p>	<p>Memorandum of Understanding signed by the Government and ADB during loan fact-finding and/or appraisal missions scheduled for mid-2006</p>	<p>ADB loan fact-finding and appraisal missions; Management Review and Staff Review Committee Meetings</p> <p>Memorandum of Understanding</p>	<p>Assumption</p> <ul style="list-style-type: none"> • Effective stakeholder participation and sense of ownership are developed. <p>Risks</p> <ul style="list-style-type: none"> • Government plans change. • The Government decides to seek alternative funding.
<p>Outputs</p> <p>1. Final Report</p> <p>2. Draft Final Report</p> <p>3. Summary EIA</p> <p>4. Resettlement Plans</p> <p>5. Interim Report</p>	<p>Submitted within 1 month of comments on Draft Final Report.</p> <p>Submitted to ADB by end-March 2006</p> <p>Submitted to ADB by end-February 2006</p> <p>Submitted to ADB by end-February 2006</p> <p>Submitted to ADB by end-January 2006</p>	<p>ADB project team review</p> <p>ADB project team, tripartite, and loan fact-finding mission reviews</p> <p>Specialist ADB review</p> <p>Specialist ADB review</p> <p>ADB project team and tripartite review</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • FSs are prepared in accordance with the agreed upon outline TOR and timely. • Information is made available to TA consultant in a timely manner • The Government facilitates meetings and consultations required. • Consultant has adequate access to project sites.

Design Summary	Performance Targets/Indicators ^a	Data Sources/Reporting Mechanisms	Assumptions and Risks
6. Inception report	Submitted to ADB by end-November 2005	ADB project team and tripartite review	Risks <ul style="list-style-type: none"> • Domestic preparation is inadequate (poor-quality domestic FSs, EIAs, and RPs). • Preparation of FSs, EIAs, and RPs is delayed.
Activities with Milestones <ol style="list-style-type: none"> 1. Undertake stakeholder analysis, establish TA methodology, develop work program (including consultation/participation arrangements) and present for endorsement at inception workshop (<i>by December 2005</i>). 2. Review the first phase of FSs, and make recommendations for finalizing FSs by DIs and IAs (<i>by January 2006</i>). 3. Establish measurement on baseline indicators on public health and environmental conditions (<i>by January 2006</i>). 4. Review sector plans and refine project rationale (<i>by December 2005</i>). 5. Design and conduct socioeconomic surveys (<i>by January 2006</i>). 6. Finish resettlement baseline surveys and confirm entitlements (<i>by January 2005</i>). 7. Conduct technical review and analysis of final FSs (<i>by February 2006</i>). 8. Complete poverty and socioeconomic analysis (<i>by March 2006</i>). 9. Complete financial analysis (<i>by March 2006</i>). 10. Complete institutional analysis (<i>by March 2006</i>). 11. Complete economic analysis (<i>by March 2006</i>). 12. Conduct final stakeholder workshop (<i>by April 2006</i>). 			Inputs <ul style="list-style-type: none"> • ADB \$600,000 • Government \$200,000

ADB = Asian Development Bank, DI = design institute, EIA = environmental impact assessment, EPB = Environmental Protection Bureau, FS = feasibility study, IA = implementing agency, NMG = Nanjing Municipal Government, RP = resettlement plan, TOR = terms of reference.

^a Baseline data and expected levels of improvement will be determined during implementation of the TA.

Source: Asian Development Bank estimates.

INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkages to the Country Poverty Analysis			
Is the sector identified as a national priority in country poverty analysis?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the sector identified as a national priority in country poverty partnership agreement?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<p>Contribution of the sector or subsector to reduce poverty in the People's Republic of China (PRC): The Nanjing Qinhuai River Environmental Improvement Project will contribute to poverty reduction through improved quality of life by reducing the incidence of waterborne diseases and flood risk in urban Nanjing, providing employment opportunities during construction and operation of project facilities, and facilitating economic development.</p>			

B. Poverty Analysis

Targeting Classification: General intervention

What type of poverty analysis is needed?

A poverty and social analysis for the Project will be carried out during implementation of the technical assistance (TA) to summarize the causes of poverty, identify the poor in the project areas, quantify how the Project will help reduce poverty, and incorporate other social measures into the project. The social dimensions will address the following issues: assessment of the demands and needs of the targeted population, gender analysis, affordability, core labor standard, social risks, and social safeguards. The analysis performed will include a quantification of employment benefits (disaggregated by gender, between poor and non-poor) and health benefits.

The assessment will also identify relevant indicators of poverty and social dimensions for incorporation into the project performance management system (PPMS).

The poverty and social analysis will be conducted following guidance in ADB's *Handbook for Incorporation of Social Dimensions in Projects*, *Handbook for Poverty and Social Analysis*, and *Handbook for Integrating Poverty Impact on Economic Analysis of Projects*.

C. Participation Process

Is there a stakeholder analysis? Yes No

A stakeholder analysis and public consultation will be integral parts of the poverty, social, environmental, and resettlement assessments. The executing agency, implementing agencies, design institutes, and consultant team will carry out public consultation during preparation of the feasibility studies.

Main stakeholders include government departments and officials at provincial, municipal, and district levels; managers and employees of implementing agencies; project beneficiaries (urban residents, new migrants, and project-affected people). Further stakeholder analysis will be carried out as necessary during TA implementation.

Is there a participation strategy? Yes No

Participatory strategy will be required for preparing poverty and social analysis, resettlement plans, and environmental impact assessment. The TA will design a participation strategy to be undertaken before and during the construction period. The participatory strategy will include a design for public information disclosure, compensation and resettlement issues, and a design for the environmental management plan.

D. Gender Development

Strategy to maximize impacts on women:

Gender analysis will be part of the poverty and social assessment to define where, when, and how gender issues will be addressed during the project design, implementation, and monitoring. The poverty and social assessment during the project design will identify strategies, mechanisms, and components for addressing gender concerns.

Has an output been prepared? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
E. Social Safeguards and Other Social Risks			
Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	The Project will involve construction and rehabilitation of wastewater treatment plants, sludge treatment and disposal facilities, sewerage pipelines, river ecological works, and a potential urban wetland. The resettlement plans will be prepared in accordance with ADB's policy on involuntary resettlement.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Affordability analysis will be included in the economic and financial analyses. The Nanjing municipal government already has a concessionary arrangement whereby poor households eligible for minimum guaranteed living allowance can receive a rebate on their water services bill.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	The Project will have no negative impact on employees of the executing and implementing agencies.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Indigenous Peoples	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	<p>The Project is not expected to cause any specific cultural or social effects on any socioeconomic group, including ethnic minorities, or exclude any from benefiting from the Project.</p> <p>The population of Nanjing is over 98% Han nationality. The minority nationalities residing in the project area are fully integrated with the Han majority.</p>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Other Risks and/or Vulnerabilities	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	No other social risks are anticipated as a result of the Project.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	370.00	0.00	370.00
ii. Domestic Consultants	0.00	98.00	98.00
b. International and Local Travel	17.00	3.00	20.00
c. Reports and Communications	0.00	10.00	10.00
2. Equipment ^b	0.00	12.00	12.00
3. Training, Seminars, and Conferences	0.00	4.00	4.00
4. Surveys	0.00	10.00	10.00
5. Miscellaneous Administration and Support Costs	0.00	18.00	18.00
6. Representative for Contract Negotiations	5.00	0.00	5.00
7. Contingencies	40.00	13.00	53.00
Subtotal (A)	432.00	168.00	600.00
B. Government Financing			
1. Office Accommodation and Transport	0.00	60.00	60.00
2. Remuneration and Per Diem of Counterpart Staff	0.00	40.00	40.00
3. Preparation of FSRs, EIAs, and RPs	0.00	75.00	75.00
4. Workshops and Tripartite Meetings	0.00	15.00	15.00
5. Others	0.00	10.00	10.00
Subtotal (B)	0.00	200.00	200.00
Total	432.00	368.00	800.00

FSR = feasibility study report, EIA = environmental impact assessment, RP = resettlement plan.

^a Financed by the Asian Development Bank's technical assistance funding program.

^b Including a minimum of two pentium computers, one photocopier, one scanner, two laser printers, and one facsimile machine.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. Review of Medium- and Long-Term Plans

1. The consultants will (i) review and analyze the medium- and long-term sector plans for wastewater; river systems rehabilitation; and stormwater, solid waste, and environmental management within Nanjing municipality; and (ii) recommend changes in the sector plans to make them more responsive to the development objectives of Nanjing. The proposed project scope, as detailed in the relevant prefeasibility reports, will be analyzed in the context of the sector plans, and recommendations will be made on the suitability of the proposed work to fulfill the objectives of the medium- and long-term plans. Where necessary, the consultants will recommend changes to the scope of work.

B. Policy Dialogue-Related Activities

2. In relation to the ongoing policy dialogue between the Asian Development Bank (ADB) and the People's Republic of China (PRC) in conjunction with ADB's urban lending program, and in order to define the policy framework relevant to project implementation, the consultants will prepare notes for policy dialogue, based on discussions with the Jiangsu provincial government and Nanjing municipal government (NMG), on (i) integrated environmental planning and management, (ii) sector institutional reform and strategic directions for private sector participation, (iii) cost recovery and tariff setting, (iv) enterprise reform and corporate governance, (v) municipal wastewater effluent standards and reuse, (vi) development of municipal solid waste infrastructure, and (vi) regulatory enforcement and monitoring. The consultants will also identify any other policy issues that should be included in future ADB-PRC policy dialogue or that are potentially significant to project implementation. Policy notes will be included in the interim, draft final, and final reports as appropriate.

C. Technical Aspects

3. At project inception stage, the consultants will brief the design institutes (DIs) assigned to undertake the feasibility studies (FSs), focusing on content, scope, level of detail, and assumptions to ensure that the quality of these important source documents meets both national and ADB requirements. Close coordination between the consultants for the technical assistance (TA) and the DIs will enhance the DIs' capacity to undertake FSs in accordance with international standards. The consultants will assist the DIs and implementing agencies (IAs) in finalizing the FSs for approval by domestic authorities.

4. For the municipal wastewater management component, the consultants will, for each of the catchment areas, (i) identify the current status of branch sewer connections and determine the targets of sewer construction; (ii) review and confirm population equivalents and growth rates up to 2020, per capita generation rates, to determine a planning horizon; (iii) review and evaluate the standards or targets for surface water quality and effluent discharge; (iv) in collaboration with the economist, assess domestic, commercial, and industrial water demands and resulting wastewater discharges; (v) assess the optimum size of treatment plants and sewer mains based on assessed wastewater flow rates in their planning horizon; (vi) review, confirm, or advise on changes to the options for effective wastewater treatment as regards volumes, influent characteristics, climatic conditions, effluent standards, recycling, and sludge treatment and disposal; and (vii) incorporate results of quantified environmental, financial, social, and economic evaluations to confirm the technical viability of the proposed project subcomponents and their least-cost characteristics. The consultants will evaluate and

recommend ways to improve (i) environmental monitoring systems for industrial discharges to sewerage systems to protect the sewer networks and the downstream treatment process; (ii) technical operation and maintenance (O&M) procedures to ensure efficiency and longevity of the sewer, pumping stations, wastewater treatment plants, and all associated equipment; (iii) equipment for sewerage system and wastewater treatment maintenance and inspection; (iv) equipment and procedures for safe operations; (v) strategy for, and means of financing, a program of sewer connections; (vi) monitoring, management, and control of final effluent discharges and recycling; and (vii) potential upgrading of operational information systems.

5. For the proposed river and stormwater management components, the consultants will (i) review and assess historical flood records and existing flood protection levels relative to required standards for urban flood protection; (ii) identify and confirm areas with localized flood risks; the population at risk from urban flooding based on the stipulated standards and the potential damage from flooding incidents; (iii) assess alternative ways to provide the required level of protection from floods; and (iv) evaluate the technical viability of the project components and confirm that the proposed components are based on least-cost options in financial, social, and economic terms. The consultant will (i) review and make appropriate recommendations on method of field investigation on sludge quality and quantity, and extent of dredging requirements; (ii) determine a practical target for dredging and achievement of the assessment criteria; (iii) formulate workplans for dredging, bank stabilization and erosion control, pumping station control center, and wetland construction; for bank stabilization and erosion control, the consultants will (i) assess the extent and identify potential causes of riverbanks' deterioration; (ii) determine types and extent of bank restoration requirements; (iii) develop performance goals and acceptance criteria; and (iv) review and confirm that the FSs are developed in sufficient thoroughness and detail to identify the engineering processes, major features, quantities, required common and special equipment, cost estimates, and potential socioeconomic and environmental impacts. For urban wetland construction, the consultants will (i) identify soil types and indigenous vegetation at the site and compare them with wetland definitions; (ii) identify the scope and scale of the proposed wetland construction/reconstruction; (iii) develop a work plan that includes procedures to achieve the proposed work, required common and special equipment, quantities, cost estimates, and necessary safety measures; and (iv) identify potential impacts of the proposed subcomponent in environmental and socioeconomic terms.

6. For the proposed sludge management component, the consultants will (i) review and evaluate Nanjing's current municipal solid waste management status and its future master planning; (ii) identify feasible sludge management alternatives under NMG's master plan; (iii) review, confirm, or advise on changes to the options for cost-effective sludge treatment and disposal alternatives; (iv) evaluate the potential for incorporating clean development mechanism measures in the context of landfill management; (v) evaluate the overall environmental impacts and the mitigating measures recommended in the FSs and/or environmental impact assessment (EIA) reports; (vi) review and quantify to the extent possible the associated costs and benefits resulting from the proposed project component; and (vii) evaluate the technical viability of the project component and confirm that the proposed component is based on the least-cost option(s).

7. The findings of these investigations and reviews will lead to the confirmation of work as proposed, or to recommendations for modifications, including a prioritization of the proposed components. Other aspects to be covered by the consultants' review, modification, and additional studies will include the following for each proposed project component as relevant: (i) design rationale, criteria, and standards; (ii) outline designs; (iii) technology selection; (iv) major instrumentation and controls systems; (v) estimated quantities of major civil works items; (vi)

unit rate for civil works items; (vii) manufacturers' budgetary estimates for major equipment (aeration systems, pumps, etc.); (viii) staffing requirements for O&M; (ix) implementation schedules; (x) consulting services inputs needed for project implementation, including institutional strengthening and development, engineering design, and construction supervision during implementation; (xi) detailed cost estimates (by foreign exchange and local currency) and cost for O&M, following ADB guidelines and standards (consultants should use costing models incorporating ADB's requirements for physical and price contingencies and interest during construction); (xii) detailed financial plans and disbursement schedule; and (xiii) recommendations for enhancing domestic capacity for project design and appraisal.

D. Environmental Impact Assessment

8. To assess environmental impacts, the consultants will review the EIAs prepared by the designated local environmental institutes in respect of each subproject, and will prepare a summary EIA in accordance with *ADB's Environment Policy (2002)* and *ADB's Environmental Assessment Guidelines (2003)*. The consultants will carry out additional studies in case there is a gap between the EIAs and the ADB requirements. Environmental assessment will (i) identify and quantify positive and negative environmental project impacts, (ii) identify environmental risks relevant to each component during construction and operation, and (iii) recommend mitigating measures and an environmental management program for each component. The environmental issues to be considered will include (i) industrial pollution control; (ii) transport, treatment, and disposal of residuals (especially sludge); (iii) potential nuisance from the construction and operation of proposed facilities; (iv) final effluent discharges and use of recycled water where appropriate; (v) resettlement; (vi) construction techniques; and (vii) material impacts on water quality. The consultants will also help prepare and undertake public consultations required by ADB and the Government. The consultants will coordinate the environmental and social analyses for the best use of resources and effectiveness of the planned consultations.

E. Financial Analysis and Financial Management Assessment

9. The consultants will work with financial analysts in the appointed DIs to design and appraise each Project component according to PRC's standards for the financial analysis of projects, and *Guidelines for the Financial Governance and Management of Investment Projects Financed by ADB*, and other relevant publications. The purpose is to assess the financial and fiscal sustainability of the ensuing project, and financial viability of the municipal wastewater companies and other IAs. The financial analysis will include, but will not be limited to, the following, applied to each subproject: (i) analyze and summarize project costs using COSTAB or similar models; (ii) review current accounting and administrative capabilities, and internal auditing system, and develop an action plan to rectify gaps and weaknesses identified; carry out and analyze a financial management assessment of the executing agency (EA)/IAs using the financial management questionnaire prepared by ADB; (iii) establish financial objectives and targets for each IA and prepare financing plans; (iv) examine the availability of local counterpart funds and assess the liquidity of the various governments for different levels of borrowing; (v) compute in real terms the financial internal rate of return and the average incremental cost in financial terms for each project component and the project as a whole; (vi) prepare financial projections over a suitable project lifetime identifying all costs and revenue streams based on capacity usage, demand projections, user growth estimates, and tariff estimates; (vii) apply sensitivity analysis to changes in assumptions and a conclusion as to the financial viability and sustainability of each component of the project; and (viii) propose commercial cofinancing and private sector involvement in the financing plan as appropriate.

F. Economic Analysis

10. The consultants will work with economic analysts in the appointed DIs to design and appraise each Project component according to PRC's standards for the economic analysis of projects, and ADB's *Guidelines for the Economic Analysis of Projects*, and other relevant publications. The economic analysis will include, but will not be limited to, the following, applied to each subproject: (i) project design: review policies for water, wastewater, and solid waste tariffs relative to ADB's position on tariffs, and recommend changes to actual tariffs as needed; identify the least-cost option based on scale, timing, location, technology, policy changes, and other relevant variables; forecast wastewater flows based on economic water demand models that incorporate projected usage charges for water and wastewater, and use them to estimate the optimal scale of investment in sewers and treatment capacity, and the least-cost expansion plans for wastewater management systems; (ii) project appraisal: review and evaluate the standards or targets for surface water quality and effluent discharge; determine if existing standards or targets are economically and socially justified, and recommend changes as needed; review and evaluate Nanjing's master plans to determine if each subproject's role in the plans is economically and socially justified. Use the results of the reviews to determine the extent of further benefit-cost analysis required to appraise the economic basis for each subproject, and conduct that appraisal accordingly; design project questionnaires for household surveys and use the responses to evaluate public preferences for the subprojects relative to other opportunities for public investment; develop economically sound indicators of the health impact of the projects, and use the household survey and other relevant sources to develop baseline estimates of those indicators; evaluate economic risks to the project components, including risks from uncertain policy changes, implementation of policy, organizational changes, and others; and (iii) development effectiveness: evaluate local procedures and capacity for the economic analysis of public investments, and recommend capacity building as needed; use the results of the project appraisal to specify assurances and other conditions attached to the loan; and evaluate the effectiveness and relevance of all conditions attached to the loan.

G. Socioeconomic Analysis

11. The consultants will work with other team members, in particular the economist, to design and arrange a survey of project beneficiaries to cover each component area under the project (the survey results will be disaggregated by gender and income group); estimate the number of project beneficiaries with income below the official poverty line in project component areas; conduct affordability analysis; identify vulnerable groups, including ethnic minority nationalities; and assess any impacts and recommend mitigating measures required for these groups. Using the survey results as appropriate, the consultants will accomplish the following tasks: (i) undertake poverty assessment of the targeted population, estimate the direct and indirect project beneficiaries disaggregated by gender, ethnicity, and income group, and evaluate project impact in reducing poverty; (ii) in collaboration with the economist, analyze affordability and willingness to pay for services, and provide pro-poor design recommendations to address the needs of vulnerable groups and people living below the poverty line; (iii) undertake social analysis in accordance with ADB's *Handbook on Poverty and Social Analysis*; (iv) in collaboration with the resettlement specialist, assess and evaluate the potential of the project to significantly and adversely affect the local community members, and propose mitigating measures per ADB policies on involuntary resettlement and indigenous people; (v) collect and analyze health data, including the incidence of morbidity and mortality rates due to waterborne diseases; (vi) review existing arrangements and procedures to involve the targeted population in project design and implementation, develop a tailored information and health education campaign and prepare programs to promote public awareness and participation; (vii)

undertake gender analysis and develop a strategy to maximize project impact on women following ADB's *Gender Checklist for Water Supply and Sanitation*; (viii) develop indicators on poverty, health, and social impact to be incorporated in the project performance management system (PPMS) and project framework; and (ix) prepare a report that addresses the following issues: project contribution to reducing poverty, methodology in poverty and social analysis, stakeholder analysis and participation strategy, strategy to maximize impacts on women, needs and demands of the targeted population, affordability analysis, health benefits from project, PPMS, and social safeguards and social risks such as resettlement, labor, ethnic minorities, and other risks and/or vulnerabilities.

H. Resettlement

12. The consultants will assess the likely extent of resettlement and determine the type of resettlement plan (RP) needed for each project component. The consultants will review the Government's draft RPs and identify any modifications required to comply with relevant PRC laws and regulations and ADB's policy on involuntary resettlement; and ADB's *Handbook on Resettlement*. In particular, the consultants will (i) evaluate the relevant local resettlement experience; (ii) as part of the socioeconomic baseline survey, assess the social impact of displaced people and workers; (iii) based on the survey results, identify compensation and rehabilitation options, and develop livelihood rehabilitation programs for displaced people; (iv) review the institutional arrangements, to distribute resettlement compensation; (v) help NMG and IAs refine the RPs, giving particular attention to budgets, implementation schedules, grievance procedures, and arrangements for internal and external monitoring and evaluation; (v) help NMG initiate a participatory process for RP preparation; and (vi) give guidance in the preparation of a resettlement information booklet and agree on appropriate arrangements for public disclosure of the RPs to affected persons.

I. Institutional Analysis, Capacity Building, and Training

13. The consultants will review and assess the institutional capacity of relevant local government departments and the designated IAs to undertake the roles they have been assigned under the Project. Based on the assessment, the consultants will accomplish the following tasks: (i) assess the optimal size of the companies, develop improved corporate management arrangements and financial procedures for the IAs by preparing an improved organizational structure and human resource plan, full financial management analysis of the project companies to verify their financial status and ensure their financial health, and an outline budgeting and business plan and framework for a management information system; and (ii) propose internal and external capacity-building and training assistance programs, including training of managers and staff responsible for service delivery to strengthen their capacity to efficiently implement, operate, and maintain the facilities; and recommend the appropriate modality for implementing the programs (e.g., through loan proceeds, existing training arrangements or as part of a locally financed program) to ensure sustainability of project benefits. The consultants will also undertake a review of relevant sector institutional, management, and operational arrangements, and analyze them relative to best international practices and their current and probable future performance, and in the context of policy dialogue on sector institutional reform and strategic directions for private sector participation. The analysis should be performed with regard to local needs and NMG's own policy and reform objectives, and should result in practical suggestions for NMG to consider. Capacity building necessary for effective implementation of reforms should also be identified.

J. Project Framework

14. The consultants, in consultation with government agencies and project stakeholders, will develop a design and monitoring framework for the project that outlines the impact, outcomes, outputs, and inputs or activities. The consultants will develop baseline environment and health indicators (including other relevant social data) necessary to effectively monitor project performance, and will collect baseline indicators as appropriate. The project framework will be developed using a problem-tree analysis and will include measures to enhance the level of participation of the beneficiaries and stakeholders in project development, which will form the basis for the PPMS and the risk and sensitivity analyses.